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**ORGAN WEIGHTS IN KRETSCHMERIAN
CONSTITUTION TYPES**

BY

UNTO UOTILA, PER FORTELIUS and ANTTI TELKKÄ

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According to the prevalent concept, the nature of the human constitution can be regarded as the sum total of the morphological, functional and psychologic characters of the individual. All these three components are probably closely interrelated. There are numerous studies concerning the somatologic habitus in the different constitutional classifications, and the psychologic characters are also often well described, whereas studies dealing with the functional properties of the constitution types are relatively few in number.

Regarding the typology of Kretschmer (2) there are, in addition to several careful investigations on the morphological and psychological characters of the three constitution types, some studies (1, 3, 4, 10) which indicate that the mode of reaction of the three types to various tolerance tests is quite different. The well known fact that the leptosomic, pyknic and athletic type have a different disposition to many maladies can also be taken as an indication of their physiological divergencies. It can be assumed that these differences, if they are sufficiently clear, are also reflected in the weights of various organs of the three Kretschmerian types. The present study was carried out in order to investigate whether the leptosomic, pyknic and athletic types in Finnish subjects differ in the relative organ weights.

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THE PRESENT INVESTIGATION

The initial series consisted of 1000 males from the autopsies performed at the Institute of Forensic Medicine, University of Helsinki, in 1949—53. An attempt was made to include only typical cases, and therefore a great part of the initial series had to be eliminated. The classification of the series into three types, leptosomics, athletics and pyknics, was done by the method of Telkkä and Uotila (7). 237 cases were eliminated because they could not be classified. Only subjects aged within 20 and 50 were taken in consideration, and therefore 331 cases had to be excluded. Furthermore, if the reaction time, i.e. the time elapsing between the injury or fatal accident and death was over 15 minutes, the case was excluded. This elimination diminished the material by 306 cases. The final series consisted of 55 leptosomics, 33 pyknics and 39 athletics. In these cases, the cause of death was either an accident, suicide or murder. In addition, when some organ was injured or showed pathological alterations, this organ was excluded from the final series.

From all the cases, in addition to the measurements required for the typological classification, the following organs were weighed immediately after their removal: brain, heart, liver, spleen, kidneys, pancreas, hypophysis, thyroid, adrenals, testes, tonsils and prostate. The weight of the brain includes that of the medulla oblongata. The heart was prepared by cutting the aorta one centimeter above the aortic valves, by opening it and liberating it from the blood clots. The liver was cut free of its ligaments and the gallbladder opened; the kidneys, pancreas, adrenals, tonsils and prostate were stripped of the surrounding adipose and connective tissue.

RESULTS

The mean body weight of the leptosomics was 61.2 ± 0.8 kg, that of the pyknics 75.4 ± 1.2 kg and that of the athletics 71.3 ± 1.3 kg.

The mean absolute weights of the organs in the three groups are given in Table 1, the mean relative weights in Table 2, and the significance of the differences in Table 3 and Fig. 1.

TABLE 1
THE MEAN ABSOLUTE WEIGHTS OF THE ORGANS (g)

	Leptosomics			Pyknics			Athletics		
	n	M	m	n	M	m	n	M	m
Brain	51	1487 ± 16		31	1486 ± 28		37	1539 ± 18	
Heart	52	346 ± 6		30	391 ± 7		37	374 ± 7	
Liver	54	1654 ± 38		31	1896 ± 60		36	1883 ± 50	
Spleen	52	126 ± 7		31	138 ± 9		37	140 ± 8	
Kidneys	53	287 ± 5		32	301 ± 5		38	312 ± 6	
Pancreas	55	90 ± 2		33	100 ± 4		38	94 ± 2	
Hypophysis ..	50	0.46 ± 0.001		32	0.45 ± 0.001		38	0.49 ± 0.0009	
Thyroid	51	32 ± 1		28	33 ± 2		31	37 ± 1	
Adrenals	53	10 ± 0.2		33	11 ± 0.4		38	11 ± 0.3	
Testes	53	35 ± 1		33	36 ± 2		39	40 ± 2	
Tonsils	41	5.3 ± 0.3		26	4.7 ± 0.4		28	5.7 ± 0.3	
Prostate	37	19 ± 0.9		21	21 ± 0.8		28	20 ± 0.9	

TABLE 2
THE MEAN RELATIVE WEIGHT OF THE ORGANS

	Leptosomics			Athletics			Pyknics		
	n	Relat- ive Weight	±SE	n	Relat- ive Weight	±SE	n	Relat- ive Weight	±SE
Brain	51	2.482	0.0417	37	2.154	0.0398	31	2.006	0.0486
Heart	52	0.569	0.00969	37	0.526	0.0117	30	0.532	0.0139
Liver	54	2.748	0.0585	36	2.626	0.0587	31	2.530	0.0856
Spleen	52	0.208	0.0102	37	0.196	0.0112	31	0.185	0.0157
Kidneys ..	53	0.476	0.0088	38	0.456	0.0139	32	0.404	0.0145
Pancreas ..	55	0.148	0.00392	38	0.133	0.00303	33	0.133	0.00429
Hypophysis	50	0.0 ³ 74 ¹	0.0 ⁴ 202	38	0.0 ³ 65	0.0 ⁴ 254	32	0.0 ³ 59	0.0 ⁴ 237
Thyroid....	51	0.0520	0.00290	31	0.0517	0.00219	28	0.0480	0.00306
Adrenals ..	53	0.0163	0.00042	38	0.0157	0.00147	33	0.0152	0.00252
Testes	53	0.0582	0.00208	39	0.0559	0.00235	33	0.0479	0.00295
Tonsils	41	0.0087	0.0 ³ 564	28	0.0078	0.0 ³ 422	26	0.0067	0.0 ³ 562
Prostate ..	37	0.0315	0.00153	28	0.0280	0.00137	22	0.0276	0.00138

¹ 0.0³74 = 0.00074

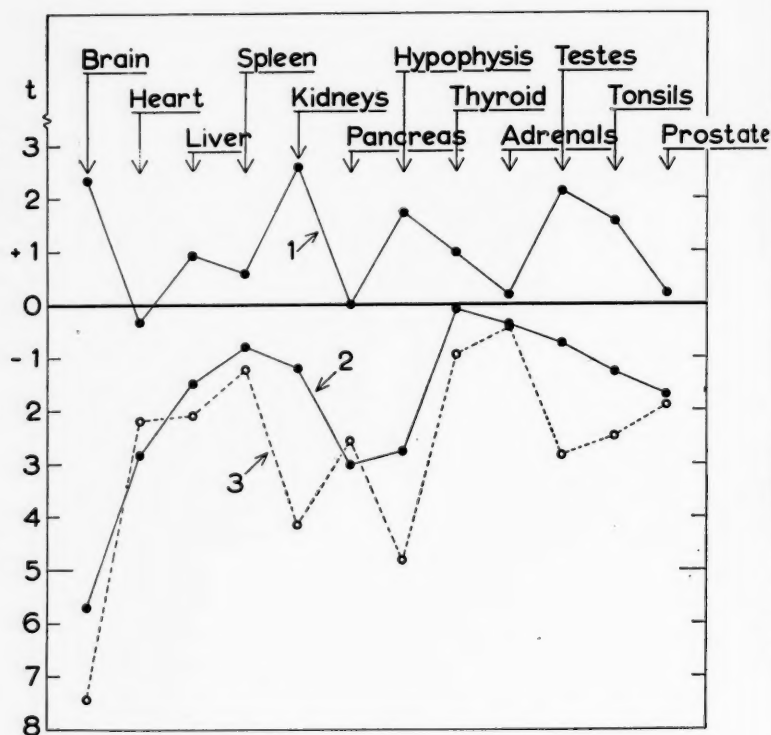
TABLE 3

THE SIGNIFICANCE OF THE DIFFERENCES IN THE MEAN RELATIVE WEIGHT OF THE ORG

	Athletics minus Pyknics			Athletics minus Leptosomics			Pyknics minus Leptosomics		
	Difference	t	P	Difference	t	P	Difference	t	P
Brain	0.0628	2.36	0.05	0.0576	-5.69	0.001	0.0640	-7.44	0.00
Heart	0.0182	-0.33	—	0.0152	-2.83	0.01	0.0169	-2.19	0.06
Liver	0.104	0.92	—	0.0829	-1.47	—	0.104	-2.10	0.06
Spleen	0.0193	0.57	—	0.0152	-0.79	—	0.0187	-1.23	—
Kidneys ..	0.0201	2.59	0.02	0.0168	-1.19	—	0.0173	-4.16	0.00
Pancreas ..	0.00525	—	—	0.00495	-3.03	0.01	0.00581	-2.58	0.02
Hypophysis	0.0 ⁴ 347 ¹	1.73	0.1	0.0 ⁴ 324	-2.78	0.01	0.0 ⁴ 311	-4.82	0.00
Thyroid....	0.00376	0.98	—	0.00363	-0.08	—	0.00422	-0.95	—
Adrenals ..	0.00292	0.17	—	0.00153	-0.39	—	0.00256	-0.43	—
Testes	0.00377	2.12	0.05	0.00314	-0.73	—	0.00361	-2.85	0.01
Tonsils	0.0 ³ 703	1.56	—	0.0 ³ 704	-1.28	—	0.0 ³ 796	-2.51	0.02
Prostate ..	0.00194	0.21	—	0.00205	-1.71	0.1	0.00206	-1.89	0.1

¹ 0.0⁴7 = 0.0000347

— = > 0.1



DISCUSSION

The absolute organ weights on the basis of a Finnish autopsy series has been previously studied by Uotila (9). In this investigation, the following mean weights were recorded for males aged 25 to 50: heart 325 g, liver 1555 g, spleen 119 g, kidneys 283 g, pancreas 80 g, hypophysis 0.53 g, thyroid 28.5 g, and adrenals 14.9 g. The present results are in all the three groups, except the weight of hypophysis and that of adrenals, in general somewhat greater than those of Uotila. For the absolute weights of the brain, testes, tonsils and prostate there is no Finnish series available for comparison. Regarding the weight of the brain and testes our results are in general agreement with the statements of Rössle and Roulet (6), and regarding the weight of the prostate the present results concur with the weights presented by Rössle and Roulet and by Törnblom (6, 8).

When comparing the mean relative weights of the organs in the three groups, it can be stated that the most pronounced differences are between the leptosomics and pyknics. Of all the twelve relative organ weights studied, the leptosomics showed a greater value in eight cases. The relative organ weights of the leptosomics were in general greater than those of the athletics, but significantly only in four organs. Athletics and pyknics showed no clear differences. Only three relative organ weights differed significantly.

Four of the relative organ weights studied, that of the spleen, thyroid, adrenals and prostate, showed no significant differences in the three groups. The relative weight of the brain was significantly different in the three groups. The leptosomics had the greatest brain, next came the athletics and then the pyknics. The leptosomics also seemed to have a larger heart than the two other groups, and the liver of the leptosomics was likewise greater than that of

Fig. 1. — The significance of the differences in the mean relative weights of organs adjusted according to the values of t (at the left). Line 1 shows the values for athletics minus pyknics. There are only three points (brain, kidneys, testes) above t value 2, thus indicating a significantly greater relative weight of these organs in athletics. Line 2 shows the values for athletics minus leptosomics. The negative t values above 2 of brain, heart, pancreas and hypophysis show a significantly greater relative weight of these organs in leptosomics. Line 3 shows the values for leptosomics minus pyknics. The negative t values above 2 of brain, heart, liver, kidneys, pancreas, hypophysis, testes and tonsils indicate a significantly greater relative weight of these organs in leptosomics.

the pyknics. The relative weights of the kidneys were greater in the leptosomics and in the athletics than in the pyknics, whereas no difference could be found between the leptosomics and athletics. The pancreas of leptosomics was larger than that of the two other groups. The leptosomics had a bigger hypophysis than the other groups, and the testes of both the leptosomics and the athletics were larger than those of the pyknics. The relative weights of the tonsils were greater in the leptosomics than in the pyknics.

Pearl and his associates (5), in their large series of studies on constitution, treated also of the endocrine organ weights in somatological habitus types. Their series was extensive comprising 1272 cases of autopsy of mentally diseased subjects. All these cases were taken into consideration without any selection. Their main result, that the relative weights of the endocrine organs are greatest in asthenics, less in intermediates (athletics) and least in pyknics, is compatible with the present findings, although we did not find so many significant differences in the endocrine weights in our selected series.

It is not possible to conclude whether the observed differences in the relative organ weights are related to the different disposition of the three types to certain maladies. The leptosomics had a greater pancreas than the pyknics, and pyknics are known to possess a greater disposition to diabetes, but whether there exists any direct correlation between these two facts is impossible to say. If we assume, in general, that a great relative weight of healthy organ could be a positive property, leptosomics seem to be in the most advantageous position, then athletics and pyknics. It is a rather widely accepted principle in experimental pathology that the relative weight of an organ is dependent on its functional level. Based on this principle and the present facts we could perhaps conclude that in leptosomics metabolism is in general on a higher level than in athletics and pyknics.

SUMMARY

Organ weights in the Kretschmerian constitution types were investigated on the basis of a Finnish autopsy series selected from 1000 male cases. After eliminations for various causes the final series comprised 55 leptosomics, 33 pyknics and 39 athletics. The

leptosomics differed in their relative organ weights clearly from the pyknics, whereas the differences between the leptosomics and athletics and between the athletics and pyknics were smaller. In general, the leptosomics showed the greatest relative weights of organs; next were the athletics and then the pyknics.

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